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THE MANAGEMENT OF POLYCHLORINATED BIPHENYLS AT THE ORGDP

ENVIRONMENTAL PROTECTION

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ABSTRACT

The program for controlling the use, handling, storage, and disposal of polychlorinated biphenyls (PCBs) and PCB wastes at the ORGDP is described. Special emphasis is placed on the various administrative programs that have been incorporated to help ensure that plant personnel and the environment are adequately protected and that all applicable regulations are met.

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*Based on work performed at the Oak Ridge Gaseous Diffusion Plant operated by the Union Carbide Corporation, Nuclear Division, for the Department of Energy.

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Polychlorinated biphenyl (PCB) fluids, which are generically known as askarels, have been used commercially since 1929 for cooling and insulating electrical equipment in applications requiring fire resistant fluids. PCBs also have several other characteristics which are desirable for the electrical industry. They provide for good heat transfer, and have good dielectric properties and chemical stability. However, it is the chemical stability that has necessitated stringent control to prevent entry into the environment. Once PCB has been introduced into the environment, it is essentially impossible to remove.

PCBs were first recognized as a widespread environmental pollutant in 1966. The Toxic Substances Control Act[1] (January 1, 1977) was the first regulation to govern PCBs. PCBs were the only chemicals mentioned specifically by name in these regulations. On February 17, 1978, the Environmental Protection Agency (EPA) published regulations[2] which outlined in detail the disposal and marking regulations for PCBs and on May 31, 1979, the EPA published what was termed the final regulations[3] for PCBs. These regulations placed even more stringent requirements on the use of PCBs.

The final EPA rule defines PCB as any substance, mixture, or item containing 50 ppm PCB or greater. These regulations also define a new category of transformer which was labeled as PCB-Contaminated. This category includes transformers that were originally designed to use PCB-free dielectric fluids but in reality contain between 50 ppm and 500 ppm of PCB as a result of contamination that occurred in manufacturing or servicing operations. According to the final regulations, as many as 38 percent of all mineral oil transformers contain between 50 ppm and 500 ppm PCB but PCB concentrations above 500 ppm are rare. A mineral oil transformer need not be tested to determine if it is PCB-Contaminated. It may be assumed to be PCB-Contaminated and then treated according to the rules as such. If the decision is made to test mineral oil transformers, then the results govern the final disposition of the transformer.

Since the promulgation of the final PCB regulations, no ORGDP mineral oil transformers have been removed from service for disposal. However, 30 drums of waste mineral oil have been generated through routine maintenance of transformers. Testing of these 30 drums revealed that nine contained greater than 50 ppm of PCBs, with two containing greater than 500 ppm of PCBs. Fourteen were found to contain from 5 ppm to 50 ppm of PCBs. Additional testing of mineral oil transformers will be conducted and appropriate actions regarding replacement/containment/disposal will be initiated.

As stated earlier, the final regulations established a PCB material as any substance, mixture, or item with 50 ppm or greater PCB. However, there is one major exception to the 50 ppm limit. The use of waste oil

containing any detectable concentration of PCBs as a sealant coating or dust control agent is prohibited.[3] Prohibited uses include, but are not limited to, road oiling, general dust control, pesticide or herbicide carrier, or rust preventative. The dumping of waste oil (e.g., in a field) is considered use as a dust control agent and is prohibited by this rule. These types of activities could result in the rapid and direct entry of PCB into the environment. Persons who process, distribute in commerce, or use waste oil must assume it contains PCBs unless it has been tested and found to contain none. If the oil is found to contain less than 50 ppm, it can be used as a fuel or in any other way that does not result in direct entry into the environment. The EPA estimates that the largest economic impact of the PCB regulations will be to the prohibitions placed on waste oil.[3]

During 1979, over 700 drums of ORGDP waste oil were tested for PCB. Of these 700 drums, 78 drums (11%) were found to contain some level of PCB. Of the 78 drums containing PCB, 34 drums contained 50 ppm to 500 ppm, 31 drums contained less than 50 ppm, and 13 drums contained greater than 500 ppm PCB. It is difficult to determine the current extent of PCB contamination since waste oil has been allowed to accumulate in the past with very little attention to its origin. Mineral oil, which is a known contributor to the problem, has not normally been segregated. Currently, all waste oil is being sampled for PCBs and uranium prior to a determination on ultimate disposal. In addition, new administrative measures have been initiated to better determine the origin of waste oils. The measures, which generally include provisions for documentation for each container of oil received, should help in determining new sources, if existant, of PCB contamination.

Storage facilities for PCBs must meet the criteria established by the EPA.[3] The facility must have an adequate roof and walls to prevent rain water from reaching stored PCBs. It must have an adequate floor and continuous curbing with a minimum 6" high curb and it must be able to contain a volume of PCB equal to twice the largest single container or 25 percent of the total PCB stored therein. Also it should not be located at a site below the 100 year flood elevation.

Currently, at the ORGDP, there are two PCB storage areas meeting all the EPA criteria. The first facility contains approximately 3,000 square feet of storage space and according to regulations will accommodate approximately 6,000 cubic feet of PCB waste. As of April 1, 1980, approximately 1/4 of the available space in this facility had been used for storage. There are approximately 2,200 square feet of storage space in the second facility which will accommodate 4,400 cubic feet of PCB waste. Approximately 1/4 of this space had been used for storage as of April 1, 1980. With the scheduled maintenance activities and the continual generation of waste oil, it is estimated that over half of the available space for PCB waste will have been used by the end of 1980. Since the ORGDP has very limited experience with PCB contamination in oil, it is difficult to ascertain how long these facilities will provide adequate storage. A new storage facility has been budgeted for 1981 to provide storage for waste oil.

During the past two years, over 70,000 Kg of PCB waste have been shipped off site to EPA approved landfills for disposal. This includes 27 transformer casings and over 100 drums of solid waste including capacitors, sorbent materials, dirt, etc. Much of this material resulted from a program at the ORGDP to eliminate all outside PCB transformers. At this time, only four outside PCB transformers remain and these transformers have been scheduled to be replaced during the next two years. During the past two years, it is estimated that over 1/4 of a million dollars have been expended to comply with PCB regulations (See Table 1). This includes administrative, maintenance, laboratory, storage, and disposal cost. It is estimated that routine cost to comply with these regulations will exceed $100,000 annually. In order to assure compliance with the PCB regulations at a minimum economic cost, very close administration must be exercised.

Table 1

PCB Cost Over Past Two Years

Item	Cost in $1,000s
Containment of PCB equipment	85
Disposal	50
Administration	50
Maintenance	40
Laboratory	30
Equipment	10
Miscellaneous	?
Sum	>265

References

1. Toxic Substances Control Act, Public Law 94-469, January 1, 1977.

2. Federal Register Vol. 43, No. 34, February 17, 1978.

3. Federal Register Vol. 44, No. 106, May 31, 1979.

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